

Claims 1-42 (canceled in the Amendment of September 14, 2002).

43. (Currently Amended) At least one of an imaging and raster-mode scanning apparatus, having comprising
a beam generator for generating an electron beam,
a scanner that deflects at least one of the actuator means for moving said electron
beam relative to a sample object so as to form a scanner and scans an object,
a sample holder acceptor for holding said sample accepting the object, and,
optionally, a deflector that deflects the sample acceptor, and
a compensator that compensates for ambient influences that may degrade an
imaging of the object, comprising:
an image acquirer that acquires for acquiring at least one of at least one pixel
pixels of an image of the said sample object and optionally of a predetermined
reference object, so as to produce image signals,
an image processor for processing said image signals, that is connected
downstream of the image acquirer,
an image display device,
an electrical filter with having a signal input and a calibration input,
at least one sensor that provides a first signal dependent on the ambient
influences, and at least one of an actuator and a control element, wherein that
might interfere with proper imaging,
the said electrical filter has having a settable transfer characteristic that can be set
by applying a second signal to a said calibration input of the said electrical filter
so as to effect the calibrate said apparatus into a calibrated state, wherein said

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ambient influences detected by the at least one said sensor are compensated such that image degradations acquired by the image acquirer are greatly reduced or essentially compensated, and

wherein the said first signal dependent on the ambient influences passes through the said electrical filter and drives at least one of an internal is combined with driving signals for said actuator means and internal control elements of the apparatus to control the scanner or the sample acceptor to compensate the ambient influences that has have an adverse effect on at least one of the imaging and on an image display acquired by the image acquirer.

44. (Previously Presented) The apparatus according to claim 43, wherein the at least one sensor is adapted to detect at least one physical quantity outside the apparatus, and to output the first signal that depends on the ambient influences at the location of the at least one sensor.

45. (Previously Presented) The apparatus according to claim 44, wherein the at least one sensor comprises at least one pick-up for electromagnetic fields, magnetic fields, air vibrations and ground vibrations.

46. (Currently Amended) The apparatus according to claim 43, wherein said signal input of the electrical filter comprises a signal input that is connected to an output of the said image processor that is connected upstream of the image acquirer for acquiring the at least one pixel of an object.

47. (Previously Presented) The apparatus according to claim 43, further comprising a calibrator that manually calibrates the filter.

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48. (Currently Amended) The apparatus according to claim 43, wherein the control elements are arranged in the image processing device said electrical filter is a digital filter.

49. (Currently Amended) The apparatus according to claim 43, wherein an output of the image processor is connected to a said calibration input of the electrical filter.

50. (Currently Amended) The apparatus according to claim 43, wherein the second signal varies as a function of at least one of scanning said relative position of the said beam to said object and of time controlled by the scanner.

51. (Currently Amended) The apparatus according to claim 44, wherein the apparatus operates in a calibration mode and subsequently operates in an image mode, whereby, in the calibration mode, ambient influences that degrade the image are detected by comparison of the image of the predetermined reference object under ambient influences with an prestored undistorted image of a real structure of the reference object in the image processor, and wherein the comparison results in a difference representing an image defect being assigned to the error signal which is said second signal being formed and output to the calibration for calibrating input of the said electrical filter for by setting the said transfer characteristic thereof, and whereby by calibration of the electrical filter ambient influences that degrade the image are greatly reduced or essentially compensated for, and whereby the image defects are compensated for by maintaining the calibration in the image mode, even in the event of a change in the ambient influences.

52. (Currently Amended) The apparatus according to claim 41 51, wherein in the calibration mode:

said prestored undistorted image of the reference object being present as a prestored undistorted reference image signal, the scanner apparatus scans, under ambient influences, a selected section of the reference object so as to obtain a distorted reference image signal,

the image processor compares a stored said prestored undistorted reference image signal assigned to the reference object with said distorted reference an image signal of the reference object under ambient influences, the image signal having been obtained from the image acquirer,

whereby in the image processor a defect so as to form said error signal is formed which is assigned to the from any difference resulting from the said comparison between the stored signal and the image signal and which the image processor outputs to the electrical filter, and

wherein the apparatus stores, in a memory, data for generating the second signal for setting the transfer parameters characteristics of the electrical filter for the image mode.

53. (Currently Amended) The apparatus according to claim 51 52, wherein in the image mode:

the scanner apparatus scans the sample object to be imaged, and the apparatus, taking the said data stored during the calibration mode as a basis, generates the second signal for defining the transfer parameters characteristics of

the electrical filter on said basis for compensation of the image defects during the scan.

54. (Previously Presented) The apparatus according to claim 44, wherein the apparatus is set up for automatically calibrating the electrical filter during an image mode.

55. (Currently Amended) The apparatus according to claim 54, wherein the said image acquirer is adapted to scan the said sample object to form successive image lines be imaged which define line centroids, or image centroids, and the said image processor is set up for determining a temporal displacement of said line centroids of successive image lines scanned within across the whole image by the image acquirer and outputs to the electrical filter, the second signal as a function of this temporal displacement to the electrical filter.

56. (Currently Amended) The apparatus according to claim 55, wherein the image processor is set up for determining a temporal displacement of the said image centroids of successive images scanned by the image acquirer and outputs the second signal as a function of this temporal displacement, as determined, to the electrical filter.

57. (Previously Presented) The apparatus according to claim 54, wherein the electrical filter is set up for carrying out a cross-correlation of the first signal and of the second signal.

58. (Previously Presented) The apparatus according to claim 43, wherein the apparatus is set up for reducing or compensating for the image degradation in two mutually orthogonal directions.

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59. (Currently Amended) The apparatus according to claim 14 43, wherein the apparatus comprises one of a scanning electron microscope, a force microscope, a surface roughness measuring instrument, an optical scanning microscope, a light microscope, a transmission electron microscope or a lithography installation.

60. (Currently Amended) The apparatus according to claim 59, wherein in the case of the electron microscope, ~~an~~ said actuator means comprises at least one of a deflector for deflecting an electron beam and a displacer that displaces the said sample object.

61. (Currently Amended) The apparatus according to claim 59, wherein in the case of the light microscope, ~~an~~ said actuator means comprises a deflector device for deflecting light or a displacer that displaces a said sample object.

62. (Currently Amended) The apparatus according to claim 46, wherein the apparatus comprises At least one of a light microscope or a transmission electron microscope, comprising wherein a camera system for displaying a sample object, a sample holder for holding a sample object, actuator means for moving said camera system relative to said sample object, the an image acquirer for acquiring pixels of said sample object and optionally of a predetermined reference object, so as to produce image signals, and an the image processor functions as one of the at least one sensors, and wherein the image processor outputs the first signal as a function of the temporal displacement that is determined for processing said image signals, an image display device.

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a digital electrical filter having a signal input and a calibration input, wherein said image processor, based on analysis of successive image signals, provides a first signal dependent on ambient influences that might interfere with proper imaging.

wherein said image acquirer and said image processor cooperate to provide a second signal dependent on ambient influences,

said electrical filter having a settable transfer characteristic that can be set by applying said second signal to said calibration input of the electrical filter to effect the apparatus into a calibrated state, wherein said ambient influences are compensated such that image degradations acquired by the image acquirer are greatly reduced or essentially compensated, and wherein said first signal dependent on the ambient influences passes through said electrical filter and is combined with driving signals for said actuator means of the apparatus to compensate the ambient influences that have an adverse effect on imaging.

63. (Currently Amended) A method for operating an imaging or raster-mode scanning apparatus for compensating ambient influences that may degrade the imaging, comprising the steps of:

providing a first signal dependent on the ambient influences,

supplying said first signal to a signal input of an electrical filter having a settable transfer characteristic which can be set by applying a second signal to a calibration input of the electrical filter, and

passing the first signal directly through ~~an~~ said electrical filter with a settable transfer characteristic which can be set by applying a second signal to a calibration input of the electrical filter,

providing an output signal of the electrical filter,
providing a driving signal for an internal actuator or an internal control element of
the apparatus and combining same with the said output signal of the said electrical
filter, which has an effect on the imaging or the image display of an image
processor acquire of said imaging or raster-mode scanning apparatus, effecting
the apparatus into a calibrated state, by applying said second signal to the
calibration input of the electrical filter for setting the transfer characteristic, such
that the any image degradation acquired by the image acquire from ambient
influences is greatly reduced or essentially compensated for.

64. (Previously Presented) The method according to claim 63, wherein the calibration of the apparatus is carried out by manual setting of the electrical filter.

65. (Currently Amended) The method according to claim 63, wherein a said internal control element in the is a member of said image processor is driven and for effecting the compensation of the image degradation is carried out at least partially in the image processor.

66. (Currently Amended) The method according to claim 63, wherein an said internal actuator in the scanner is driven is a means for moving an electron beam relatively to a sample object so as to form a scanner and the compensation of the image degradation is carried out at least partially by driving the said internal actuator of the scanner.

67. (Currently Amended) The method according to claim 63, wherein the apparatus is operated in a calibration mode and subsequently in an image mode, whereby

ambient influences that degrade the imaging are detected by means of a sensor which is arranged outside the apparatus and drives a signal input of the electrical filter, whereby

in the calibration mode, the degeneration of the image is greatly reduced or essentially compensated for by an imaging of a predetermined reference object under ambient influences and a comparison of the image of the reference object with the a prestored undistorted image of the real structure of the reference object and by calibration of the transfer characteristic of the filter, and

in the image mode, the degradation of the image is at least partially compensated for by maintaining the calibration, even in the event of a change in the ambient influences.

68. (Currently Amended) The method according to claim 67, wherein the calibration mode comprises at least the following steps:

~~determination of determining~~ the first signal which depends on ~~the interfering any~~ ambient influence at the location of the sensor, by the sensor arranged outside the apparatus;

~~application of applying~~ the first signal to the signal input of ~~the said electrical~~ filter;

~~acquisition of acquiring~~ a selected section of the predetermined reference object by the ~~image acquirer~~ by the scanning of the reference object under ambient influence so as to produce an actual image signal of the selected section;

~~comparison comparing~~ the actual image signal of the acquired selected section of the reference object under ambient influences with a prestored undistorted image

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signal the real structure of the reference object; and so as to form an error signal which is determination of a defect signal assigned to a difference between prestored undistorted image signal and actual image signal which results from the comparison;

application of applying the second signal, derived from the defect said error signal, to the regulating calibration input of the said electrical filter for defining setting the transfer characteristic of the electrical filter;

application of applying the output signal of the electrical filter to the signal input of a regulating amplifier;

application of applying the output signal of the said regulating amplifier to an actuator or a control element to control an internal scanner for which is for scanning a sample object or said reference object by deflecting a beam or scanning an object or by for deflecting moving a sample holder relative to said beam, said deflecting of said beam or said moving of said sample holder being influenced so as to correct imaging acceptor that accepts the object or reference object for the purpose of correcting the degraded image quality;

iterative calibration of the characteristic of the electrical filter, in such a way that the reduction of the imaging quality is greatly reduced or essentially compensated for, by means of the following steps repeating the iterations of the steps of comparing said actual image signal and said prestored undistorted image signal so as to:

comparison of the corrected image of the reference object under ambient influence with the real structure of the reference object,

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alteration of the modify said characteristic of the said electrical filter for minimizing said error signal in such a way that the corrected image approximates to the real structure of the reference object, storage of and storing data determined by iterative calibration for providing the transfer characteristic of the electrical filter for the said image mode.

69. (Currently Amended) The method according to claim 67 68, wherein in the image mode, an image signal of the said object is acquired by scanning, the with said transfer characteristic of the said electrical filter of the apparatus that has been determined being fixed in the said calibration mode being fixedly prescribed, and the and wherein said output signal of the said electrical filter, which is a digital filter, after passing through a regulating amplifier, is assigned supplied to the an internal actuator or the control element which is a means for moving a beam relatively to said sample object in the manner of a scanner, with the result that the ambient influences that degrade the imaging of the sample object acquired by the scan are greatly reduced or essentially compensated for even in the event of a change in the ambient influences.

70. (Currently Amended) The method according to claim 63, wherein ambient influences which impair the imaging of the image acquirer are detected by means of the sensor, which is arranged outside the apparatus and drives the signal input of the electrical filter which is a digital filter, with the first signal, the image acquirer feeds its acquired image signal to an said image processor, in which makes an image analysis of the an image of a sample object or a reference object acquired by the said imaging or raster-mode scanning apparatus and

produces a setting signal image acquirer is carried out and a signal dependent on the analysis is applied as the second signal dependent on the such image analysis which is applied as the said second signal to the said calibration input of the said electrical filter;

the output of the electrical filter is applied via a regulating amplifier to the actuator or the control element of the apparatus, which has an effect on the image, the image degradation thereby being greatly reduced or essentially compensated for.

71. (Currently Amended) The method according to claim 70, wherein
an object to be imaged is scanned by the image acquirer,
the image analysis comprises a recursive determination of a temporal displacement of line centroids of successive image lines within the whole image of the said reference object, scanned by the image acquirer, whereby and whereby the said second signal is calculated from the said temporal displacement.

72. (Currently Amended) The method according to claim 70, wherein
successive images of said reference object are taken, wherein the image analysis comprises a recursive determination of a temporal displacement of image centroids of said successive image acquired by the image acquirer, and wherein said the second signal is calculated from the said temporal displacement.

73. (Currently Amended) The method according to claim 71, wherein essentially a cross-correlation of the first signal with the second signal is carried out in and an output signal of the electrical filter and, consequently, the actuator or the control element is fed with a drive signal which is dependent on the cross-correlation

between the first signal and the second signal is supplied to said actuator or control element.

74. (Currently Amended) The method according to claim 63, comprising the steps of feeding ~~an~~ said image processor with an image signal ~~of the~~ from an image acquirer ~~acquired from the image;~~ analyzing the image signal in the image processor; ~~and~~ applying a signal dependent on the result ~~of the~~ of said analyzing step as the said first signal to a said signal input of the electrical filter; and applying a signal dependent on the result of the analyzing step as the first signal to a signal input of the filter; and applying a signal dependent on the result of the analyzing step as the second signal to a said calibration signal input of the electrical filter; and applying the output of the electrical filter via a regulating amplifier to the said internal actuator ~~via an~~ or said internal control element ~~so as to reduce~~ of the apparatus, ~~which has an effect on the imaging, the imaging degradation thereby being greatly reduced or essentially compensated for.~~

75. (Currently Amended) The method according to claim 74, wherein successive image lines within any image acquired and line centroids thereof or image centroids of successive image are determined, and wherein the said analyzing step ~~of the image acquired by the image acquirer~~ comprises a recursive determining determination of a any displacement of said line centroids of said successive image lines within the whole acquired image or the a recursive determination of the any displacement of the said image centroids of successive images.

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76. (Currently Amended) The method according to claim 63, wherein ~~the image degradation is essentially compensated for by means of the actuators or the control elements acting in two mutually orthogonal directions~~ are provided for compensating any image degradation.

77. Currently Amended) An apparatus for compensating for ambient influences in imaging or raster-mode scanning apparatuses that may degrade the imaging with an image acquisition and an image processing device producing an image of a sample object or a reference object, comprising
a calibratable digital electrical filter with a signal input and a calibration input;
a regulating amplifier which is electrically connected downstream of the electrical filter,
an internal control element controlled by the regulating amplifier;
wherein a first signal dependent on the ambient influences is applied to the signal input of the electrical filter which generates an output signal at the output of the electrical filter, and
wherein a second signal is applied to the calibration input of the electrical filter to calibrate the electrical filter, and
wherein the internally controlled control element has an effect on the said image acquired produced by the said image acquisition and an image processor processing device,
whereby in the calibrated state of the electrical filter, the image degradation is greatly reduced or essentially compensated for.

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78. (Previously Presented) The apparatus according to claim 77, further comprising at least one sensor for detecting at least one physical quantity outside the apparatus, this sensor outputting the first signal which is dependent on the ambient influences at the location of the sensor.

79. (Currently Amended) The apparatus according to claim 49, wherein the apparatus is designed for operation in a calibration mode and for subsequent operation in an image mode, whereby, in the calibration mode, ambient influences which degrade the image are detected by the comparison of the image of the predetermined said reference object under ambient influences with an prestored undistorted image signal of the real structure of the reference object in the image processor, wherein the comparison results in a difference representing an image defect error signal being assigned to the second signal being formed and output to the calibration input of the electrical filter for setting the transfer characteristic of said electrical filter, whereby by calibration of the electrical filter, ambient influences which degrade the image are greatly reduced or essentially compensated for, and whereby the image defects are compensated for by maintaining the calibration in the image mode, even in the event of a change in the ambient influences.

80. (Currently Amended) The apparatus according to claim 49, wherein the apparatus is set up for automatically calibrating the electrical filter during the image mode.

81. (Currently Amended) The apparatus according to claim 49, wherein the apparatus comprising in the form of a light microscope or a transmission electron microscope also comprising means for analyzing temporal displacement in said

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image signals, the first signal also being determined from the said temporal displacement that is determined in said image signals.

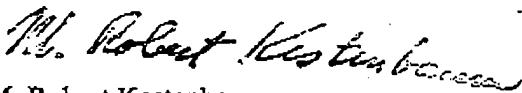
82. (Currently Amended) The apparatus according to claim 56, comprising in the form of a light microscope or a transmission electron microscope also comprising means for analyzing temporal displacement in said image signals, the first signal also being determined from the temporal displacement that is determined in said image signals.

83. (Currently Amended) The apparatus according to claim 46, for operation in a calibration mode and subsequently operable in an image mode, whereby, in the calibration mode, ambient influences which degrade the image are detected by the comparison of the image of the said optional predetermined reference object under ambient influences with an a prestored undistorted image signal of the real structure of the reference object in the image processor, wherein the comparison results in a difference representing an image defect error signal being assigned to the second signal being formed and output of the calibration input of the electrical filter for setting the transfer characteristic of said electrical filter, whereby by calibration of the electrical filter so as to reduce ambient influences which might degrade imaging, the image are greatly reduced or essentially compensated for, and whereby the image defects are compensated for by maintaining the calibration in the image mode, even in the event of a change in the ambient influences.

Applicant respectfully believes the present submission fully responds to the Notice of Non-Compliant Amendment that was mailed on 3 April 2004. Applicant respectfully requests that the previously submitted Amendment filed by Applicant on 30 January 2004 now be conveyed to the Examiner for review.

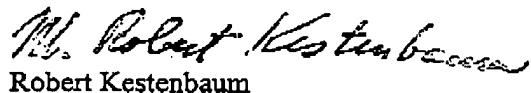
Thank you in advance.

Respectfully Submitted,



M. Robert Kestenbaum

I hereby certify this correspondence is being submitted to Commissioner for Patents, Alexandria, Va. 22313-1450 by facsimile transmission on April 13, 2004, Fax number (703) 872-9306.



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